Assembly Instructions

English

Grundig SAT Systems

PROFESSIONAL

HDTV Digital QAM

PHDQ 1000 ASI LAN
PHDQ 1001

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1 Safety regulations

Caution

- Assembly, installation and servicing should be carried out by authorised electricians.
- Switch off the operating voltage of the system before beginning with assembly or service work or pull out the mains plug.
- Do not perform installation and service work during thunderstorms.
- Install the system so it will not be able to vibrate…
  - in a dust-free, dry environment
  - in such a manner that it is protected from moisture, fumes, splashing water and dampness
  - somewhere protected from direct sunlight
  - not within the immediate vicinity of heat sources
  - in an ambient temperature of -20 °C to +50 °C.
- Ensure that the head-end station is adequately ventilated. Do not cover the ventilation slots.
- Beware of short circuits
- No liability is accepted for any damage caused by faulty connections or inappropriate handling.
- Observe the relevant standards, regulations and guidelines on the installation and operation of antenna systems.
- Earth the SAT receiver in accordance with DIN EN 50083-1 / EN 60728-11 and VDE 0855 (earthed, equipotential bonding).
- **For further information please read the assembly instructions for the head-end station used.**

Take action to prevent static discharge when working on the device.

2 General information

2.1 Packing contents

1 Cassette PHDQ 1000 ASI LAN or PHDQ 1001
2 HF cables
1 CD (assembly instructions)
1 Brief assembly instructions

2.2 Meaning of the symbols used

Important note

—> General note

• Performing works

2.3 Technical data

The devices meet the following EU directives:

2006/95/EC, 2004/108/EC

The product fulfils the guidelines and standards for CE labelling.

HF input

Frequency range:	925 ... 2150 MHz
Level range:	60 dBµV ... 80 dBµV
DVB-S modes:	DVB-S $^{1}/_{2}$, $^{2}/_{3}$, $^{3}/_{4}$, $^{5}/_{6}$, $^{7}/_{8}$
DVB-S2 modes:	QPSK $^{1}/_{2}$, $^{3}/_{5}$, $^{2}/_{3}$, $^{3}/_{4}$, $^{4}/_{5}$, $^{5}/_{6}$, $^{8}/_{9}$, $^{9}/_{10}$
	8PSK $^{3}/_{5}$, $^{2}/_{3}$, $^{3}/_{4}$, $^{5}/_{6}$, $^{8}/_{9}$, $^{9}/_{10}$
Symbol rate DVB-S:	QPSK: 2 ... 45 MSymb/s
Symbol rate DVB-S2:	QPSK: 10 ... 30 MSymb/s
	8PSK: 10 ... 31 MSymb/s

HF output

Channels:	S21 ... C69
Frequency range:	42.0 MHz ... 860.0 MHz
Output level:	typ. 97 dBµV
Output impedance:	75 Ω

Connections

SAT inputs:	2 F sockets
HF output:	1 IEC socket
ASI input:	1 BNC socket, 75 Ω
ASI output:	1 BNC socket, 75 Ω
Connection strip (10-pin):	for supply voltages and control circuits
RS-232 socket:	serial interface for software update
Conditional access:	several channels can be decoded.

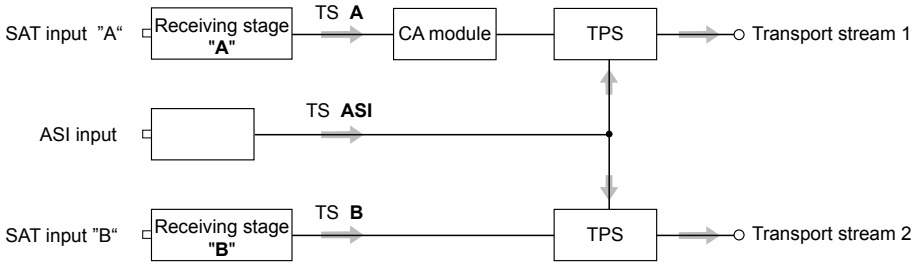
2.4 Description

The double transmodulator cassette is a QPSK-converter, which converts all stations modulated according to DVB-S / DVB-S2 standard into two QAM-modulated cable signals. The cassette has two digital SAT IF inputs and one HF output. Additionally it is equipped with an ASI input and an ASI output (ASI – Asynchronous Serial Interface acc. DIN EN 50083-9).
The transport stream fed via the ASI socket can be inserted into the transport streams of the receiving stages via the TPS module. The signal path is set in the menu items input signal path "**INROUTE**" and output signal path "**OUTROUTE**".

2.4.1 Input signal path "INROUTE"

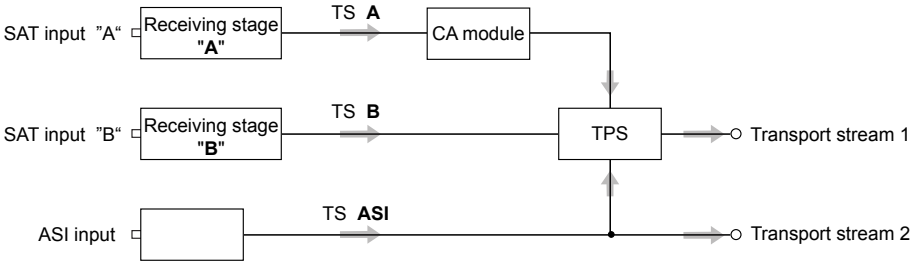
2.4.1.1 Menu setting "A+ASI = 1 B+ASI = 2"

The transport streams of the receiving stage "TS **A**" and of the ASI input "TS **ASI**" generate the transport stream 1. The transport streams of the receiving stage "TS **B**" and of the ASI input "TS **ASI**" generate the transport stream 2.



2.4.1.2 Menu setting "A+B+ASI = 1 ASI = 2"

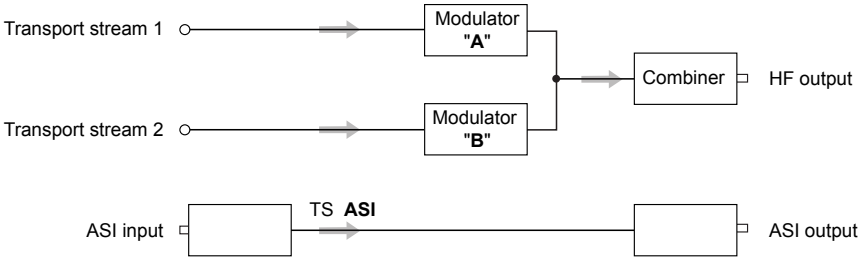
The transport streams of the receiving stages "TS **A**" and "TS **B**" and of the ASI input "TS **ASI**" generate the transport stream 1. The "TS **ASI**" transport stream fed via the ASI input generates the transport stream 2.



2.4.2 Output signal path "OUTROUTE"

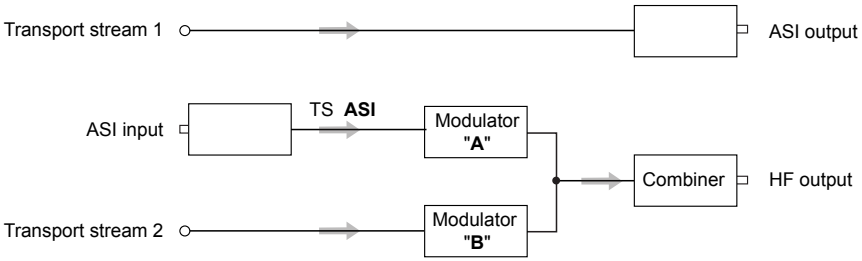
2.4.2.1 Menu setting "ASI => ASI"

Transport stream 1 is made available via modulator "**A**", transport stream 2 via modulator "**B**" and the transport stream from the ASI input "TS **ASI**" via the ASI output.



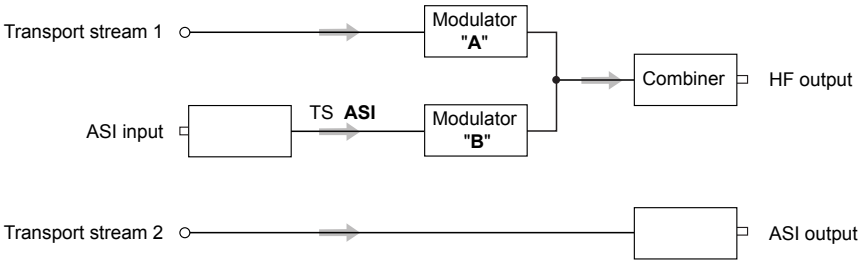
2.4.2.2 Menu setting "1 => ASI ASI => MA"

Transport stream 1 is made available via the ASI output, transport stream 2 via modulator "**B**" and the transport stream from the ASI input "TS **ASI**" via modulator "**A**" (MA).



2.4.2.3 Menu setting "2 => ASI ASI => MB"

Transport stream 1 is made available via modulator "**A**", transport stream 2 via the ASI output and the transport stream from the ASI input "TS **ASI**" via modulator "**B**" (MB).



2.4.3 General

The cassette is equipped with two channel strips ("**A**" and "**B**"). The channel strips consist of the digital tuners, the digital signal preparation units and the output converter. The channel strips are indicated in the head-end station display with "**Bx ...A**" and "**Bx ...B**". Using an adequate CA module encoded channels can be decoded via channel strip "**A**". In addition cassette PHDQ 1001 is able to encode uncoded channels via an adequate CA module. The control of the cassette takes place via the control unit of the head-end station.
Two LEDs indicate if the respective channel strip is switched on (LED illuminates) or off, and also provide an indication of the signal quality based on their colour. Additionally the quality of the transport stream received is displayed ("**CN...**"). The integrated TPS module (Transport Stream Processing) processes the data from the demodulated transport streams.
The HF output signals are sent through the HF output of the cassette to the output collector. The common output level of the channel strips can be set at the output collector. Additionally a transport stream is made available via the ASI output dependent on the signal path set.
When the head-end station is switched on, the two-line LC display shows the software version of the control unit.
To operate this cassette the software version of the control unit must be "**V 41**" or higher. You can find the current operating software for the control unit and the cassette, the software "**BE-Flash**" and the current assembly instructions on the website "***www.gss.de***".
The cassette is designed for use in the following head-end stations:
- PSU 12
- PSU 8
- PGT 8
- PST 19-1

2.5 Software query

Control unit

If necessary, you can activate the indication of the software version of the control unit manually:

- Press any two keys on the control unit of the head-end station simultaneously until the display goes dark and the software version, e.g. "**V 41**" appears.

2.6 How the TPS module works

After decoding QPSK- or 8PSK-modulated signals, the demodulated data stream can be accessed via the integrated TPS module. This data stream, also called transport stream, contains several stations in all their components (video, audio, data and service information), which can be changed using the TPS module.

The individual functions

Station filter

Individual stations can be deleted. This reduces the data rate and, consequently, the output symbol rate required. Additionally stations of the different transport streams can be assembled to a new transport stream.

Stuffing

The transport stream is padded using what is known as zero data. This ensures a steady and constant output symbol rate.

Changing the NIT

The transport stream contains data in the form of tables which the receivers evaluate and require for convenient use. The TPS module can adjust the "Network Information Table" (NIT) to accommodate the new station data. The "NIT" contains data which is required by the set-top box for the automatic search feature.

Changing the operator ID (CAT)

Some network operators transmit an operator ID in the data stream (e.g. visAvision). By changing the CAT the operator ID can be adjusted to the demands.

2.7 Explanation of the term "symbol rate"

Modulation schemes such as QPSK and QAM transmit multiple bits simultaneously. These are referred to as symbols. In addition to the user data flow which transmits video and audio information, error correction bits are transferred. The FEC number states the ratio of user bits to the complete transmitted bits. The output symbol rate is calculated as follows:

256-QAM: **SR (A)** = FEC x $^1/_4$ x SR (E)
128-QAM: **SR (A)** = FEC x $^2/_7$ x SR (E)
64-QAM: **SR (A)** = FEC x $^1/_3$ x SR (E)
32-QAM: **SR (A)** = FEC x $^2/_5$ x SR (E)
16-QAM: **SR (A)** = FEC x $^1/_2$ x SR (E)
4-QAM: **SR (A)** = FEC x $^1/_1$ x SR (E)

Example:
Output symbol rate 64-QAM, FEC= $^3/_4$,
Input symbol rate SR (E) = 27,500 kSymb/s

SR (A) = $^3/_4$ x $^1/_3$ x 27,500 kSymb/s
SR (A) = 6,875 kSymb/s

Note:
If no "FEC" is stated in the station lists, it can be assumed to be "FEC = $^3/_4$".

Reception from a transponder with a very low symbol rate (SCPC station)
The extremely low data rate means that the output symbol rate is very low. If there are reception problems with different digital receivers, set output symbol rate to a higher value.

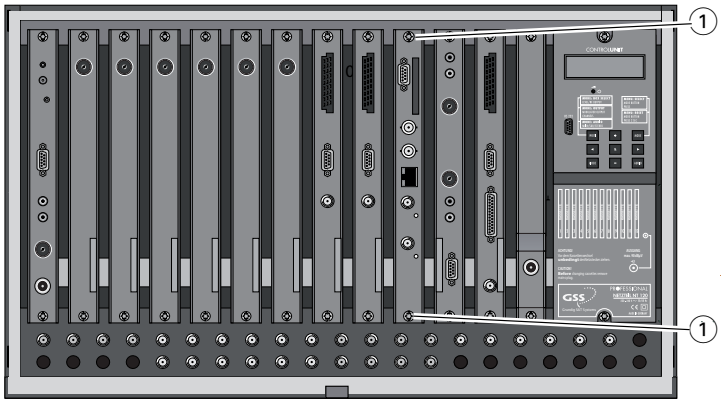
Defined symbol rates
Some cable operators specify a fixed symbol rate (e.g. 6,900 kSymb/s).

3 Assembly

3.1 Installing the cassette

– Ensure the head-end station is mounted so it will not be able to vibrate. Avoid, for example, mounting the head-end station onto a lift shaft or any other wall or floor construction that vibrates in a similar way.
– Before installing or changing a cassette unplug the power cable from the mains power socket.

- Remove the fastening screws (1) of an unoccupied slot from the bracket of the head-end station.
- Insert the cassette in this slot and push it into the housing.
- Align the cassette and apply slight pressure to connect it to the connections of the board and the HF bus bar.
- Fasten the cassette with the screws (1).

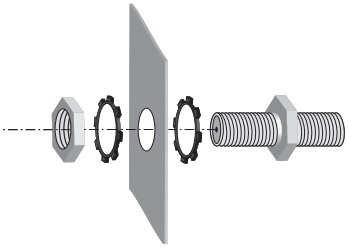


3.2 EMC regulations

To comply with the current EMC regulations, it is necessary to connect the lines leading in and out of the head-end station using cable terminals.

The attenuation of shielding of the connection lines for ASI and antenna must meet the requirements for "Class A".

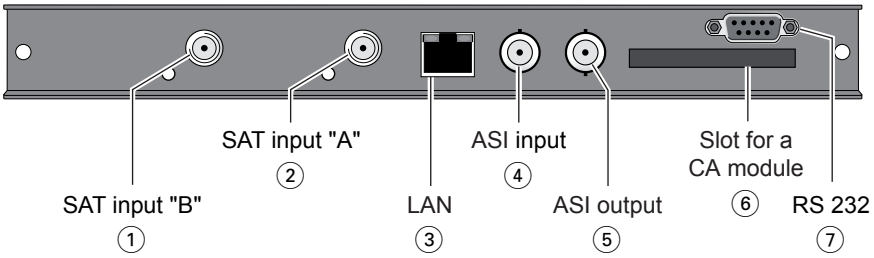
When mounting the cassette in a PGT 8 or PST 19-1 head-end station which is installed in a 19" cabinet, make sure the connections leading in and out for the 19" cabinet are made using cable terminals.



- Insert the required number of cable terminals in the openings provided in the head-end station or in the 19" cabinet.
  —> Cable terminals are not included in the scope of delivery.

Tighten the nut on the cable terminal until the teeth on the lock washer have penetrated the exterior coating and a good connection is made between the housing and cable terminal.

3.3 Connecting the cassette



- Plug the SAT input cables into the SAT input sockets "**SAT input A**" (2) (channel strip "A") and "**SAT input B**" (1) (channel strip "B").
  —> LAN socket (3) (intended for additional functions)
- Connect the ASI sockets (4) and (5).
- Connect the head-end station to the mains power supply.

(6) Slot for a CA module

(7) "**RS-232**" socket
The operating software of the cassette can be updated via the 9-Pin D-SUB socket "RS232" using a PC or notebook and the software "**BE-Flash**".
You can find the current operating software on the website "***www.gss.de***".

3.4 Retrofitting a CA module

The cassette is equipped with a common interface. It allows you to connect a CA module for various encryption systems and service providers. Encoded channels can only be decoded with a CA module suitable for the encoding system and the corresponding smart card. The smart card contains all the information for authorisation, decoding and subscription.

Caution

- Check with the distributor or manufacturer of the CA module to be used to ensure that it is suitable for decoding several channels.
- **The hardware and software of this cassette have been thoroughly prepared and tested.**
- **Any changes made by programme providers to the structures in the programme data might impair or even prevent this function.**
- When working with the CA module, please read the corresponding operating manual from the respective provider.

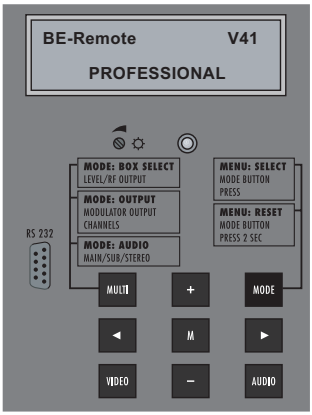
- Insert the smart card into the CA module so that the chip on the smart card faces the thicker side (top) of the CA module.
- Insert the CA module into the slot (6) (s. chap. 3.3) with the top side of the CA module facing the top side of the cassette.
- Push the CA module without canting into the guide rails of the CA slot (6) and contact it to the common interface.

4 The control panel at a glance

4.1 Menu items

Programme the cassette using the buttons on the control unit of the head-end station. The two-line display of the control unit then shows the menus.
The parameters and functions to be set are underlined.
Use the **MODE** key to select the following main menu items:

- Input signal path
- Output signal path
- Channel strip
- Selecting channel / frequency setting
- Output channel / output frequency
- Output level
- LNB oscillator frequency
- Input symbol rate
- Input frequency
- Station filter
- QAM modulation
- Stuffing
- Substitute signal
- Network Information Table (NIT)
- Network/operator identification
- Deleting a PID
- Renaming a PID



4.2 Control panel

The key pad on the head-end station is used to scroll through the menus and menu items one at a time:

MODE scrolls forward through the menus.

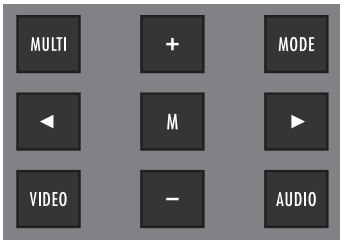
◄/► select parameters in the menus.

+/- set values, initiate actions.

MULTI selects sub-menus.

AUDIO scrolls backward through the menus.

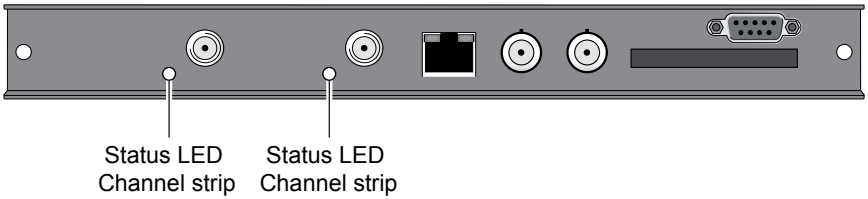
M saves all entries.



5 Programming

5.1 Preparation

- Connect the test receiver to the HF output or the test output of the head-end station.
- Set the output channel / output frequency of the cassette (s. page 25) and adjust the TV test receiver to this channel.
- Switch on the channel strip (modulator) if necessary (s. page 26). For each channel strip, there is a status LED which indicates if the channel strip is switched on.



- Balance the output levels of the channel strips "**A**" and "**B**" if the difference in level is ≥ 1 dB (page 26).

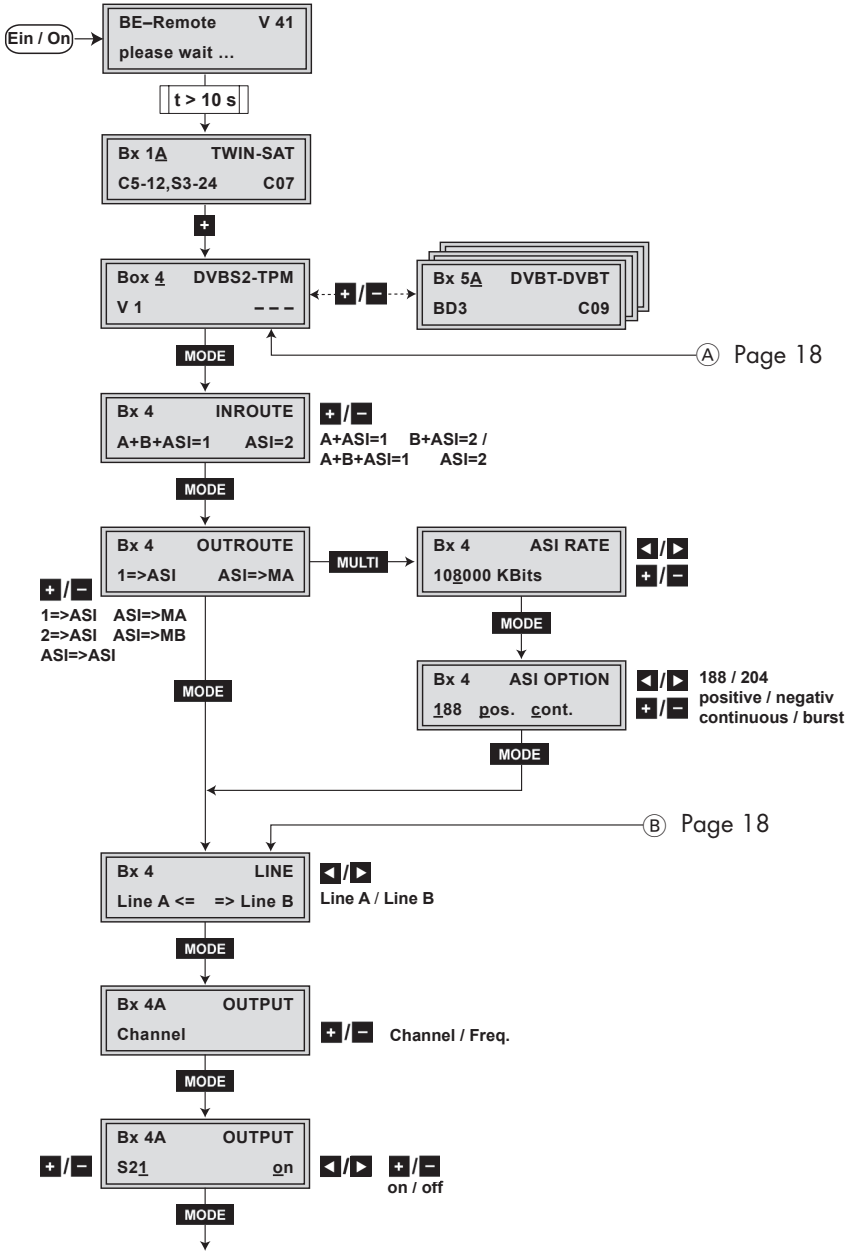
5.2 Notes on level setting

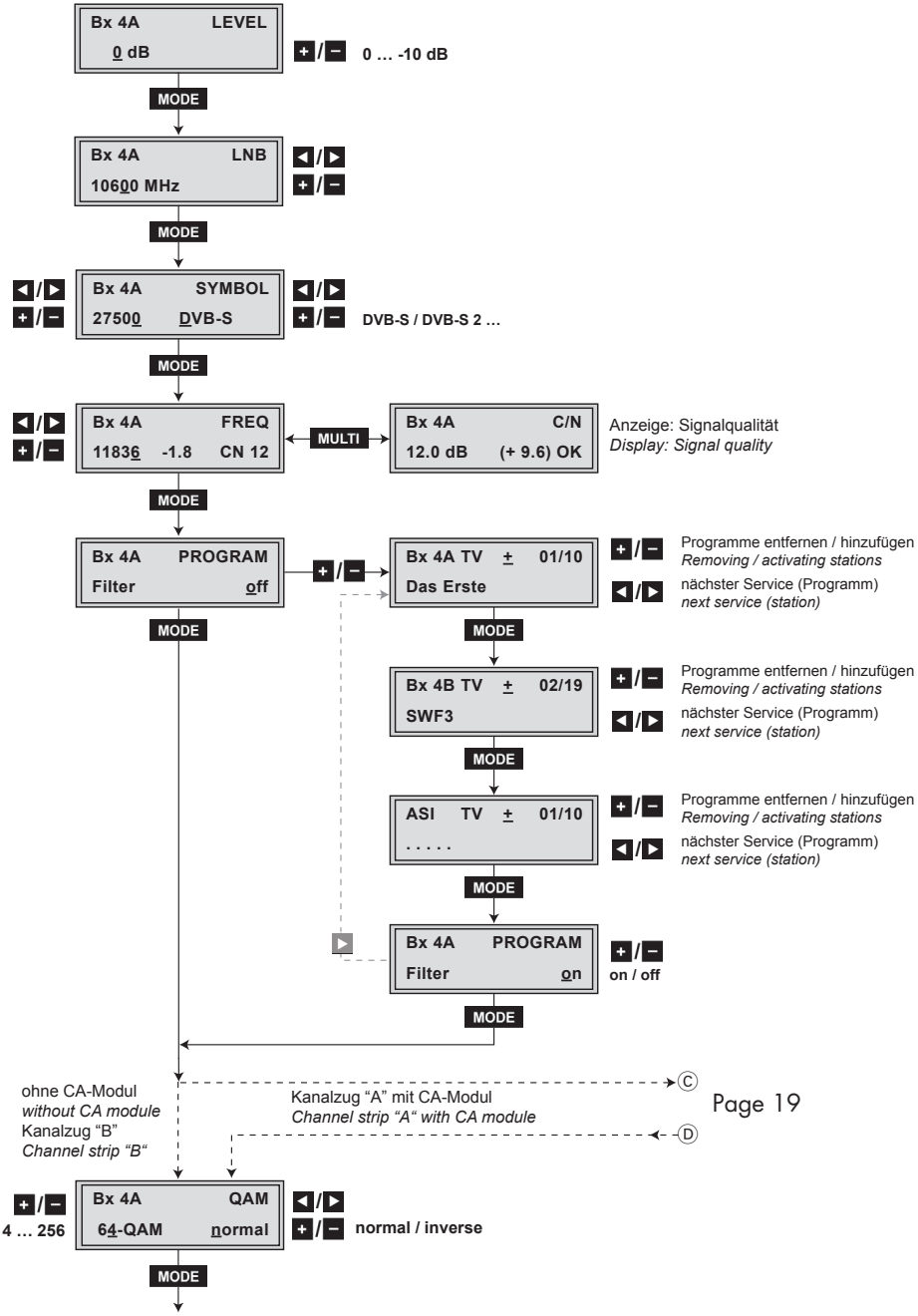
In order to prevent interference within the head-end station and the cable system, the output level of the cassette must be decreased by 10 dB compared to analogue cassettes at 64 QAM, and by 4 dB compared to analogue cassettes at 256 QAM.

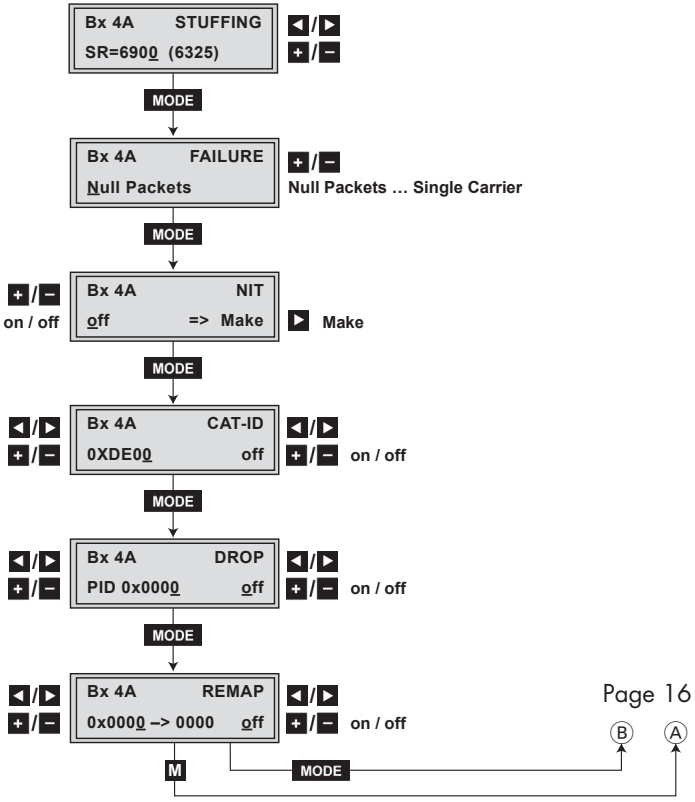
- Measure the output levels of the other cassettes and tune them to a uniform output level using the appropriate level controls or software dependent on the head-end station used. Please regard the assembly instructions of the respective head-end station.

5.3 Programming procedure

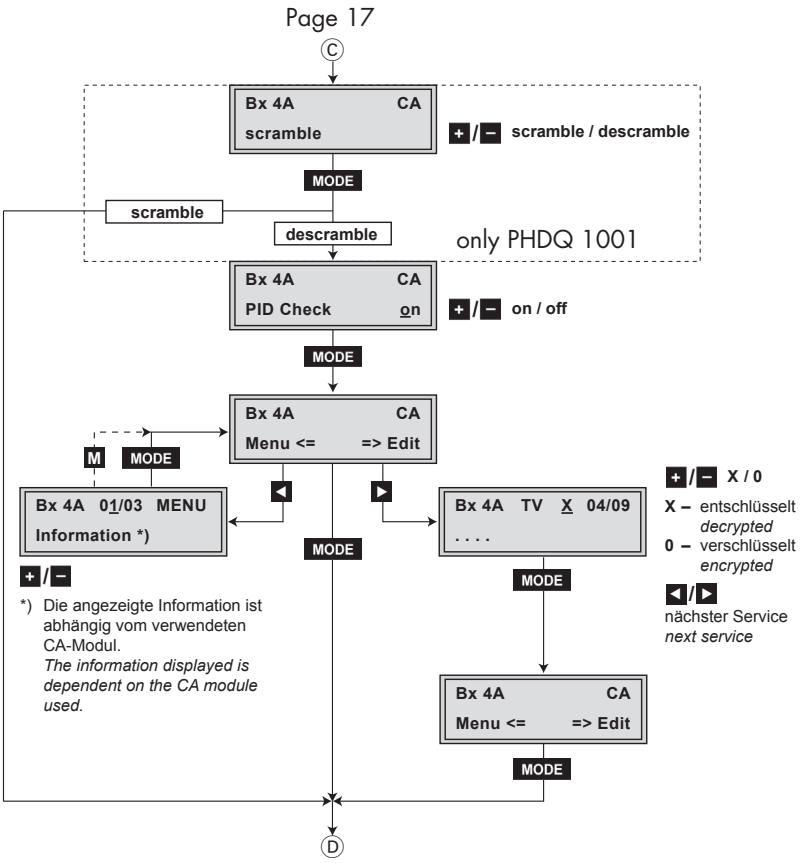
5.3.1 Channel strips “A” (without CA module) and “B”




Bx 4A LEVEL
0 dB
+/− 0 … -10 dB
MODE
Bx 4A LNB
10600 MHz
◀/▶ +/−
MODE
Bx 4A SYMBOL
27500 DVB-S
◀/▶ +/− DVB-S / DVB-S 2 …
MODE
Bx 4A FREQ
11836 -1.8 CN 12
MULTI
Bx 4A C/N
12.0 dB (+ 9.6) OK
Anzeige: Signalqualität
Display: Signal quality
MODE
Bx 4A PROGRAM
Filter off
+/−
Bx 4A TV ± 01/10
Das Erste
+/− Programme entfernen / hinzufügen
Removing / activating stations
◀/▶ nächster Service (Programm)
next service (station)
MODE
Bx 4B TV ± 02/19
SWF3
+/− Programme entfernen / hinzufügen
Removing / activating stations
◀/▶ nächster Service (Programm)
next service (station)
MODE
ASI TV ± 01/10
. . . . .
+/− Programme entfernen / hinzufügen
Removing / activating stations
◀/▶ nächster Service (Programm)
next service (station)
MODE
Bx 4A PROGRAM
Filter on
+/− on / off
MODE
ohne CA-Modul
without CA module
Kanalzug “B”
Channel strip “B“
Kanalzug “A” mit CA-Modul
Channel strip “A“ with CA module
Page 19
+/− 4 … 256
Bx 4A QAM
64-QAM normal
◀/▶ +/− normal / inverse
MODE


Bx 4A STUFFING
SR=6900 (6325)
MODE
Bx 4A FAILURE
Null Packets
Null Packets … Single Carrier
MODE
Bx 4A NIT
off => Make
on / off
Make
MODE
Bx 4A CAT-ID
0XDE00 off
on / off
MODE
Bx 4A DROP
PID 0x0000 off
on / off
MODE
Bx 4A REMAP
0x0000 –> 0000 off
on / off
M
MODE
Page 16
B
A

5.3.2 Channel strip "A" with CA module



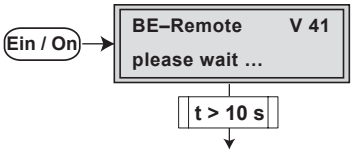
Page 17

5.4 Programming the cassette

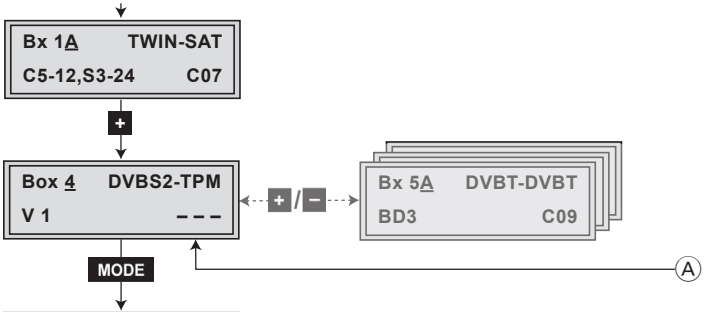
—> Pressing the **MODE** button for longer than 2 seconds cancels the programming procedure. This takes you back to the programme item "Selecting the cassette" from any menu. Any entries that have not been saved are reset to the previous settings.

—> Entries in the menus can be saved by pressing the **M** key. You are taken back to the "Selecting the cassette" menu item.

- Switch on the head-end station
  —> The display shows the software version (e.g. V 41)
  —> The processor reads the cassettes' data (approx. 10 seconds).



Selecting the cassette



- Select the cassette you want to programme (e.g. **Box 4**) by repeatedly pressing the button **+** if necessary.
  —> The display shows e.g. the menu "**Box 4 DVBS2-TPM**":
  "**Box 4**" stands for slot 4
  "**DVBS2-TPM**" Type of cassette
  "**V 1**" Software version of the cassette

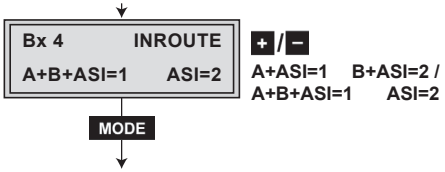
- Press the **MODE** button.
  —> The "Selecting the input signal path" – "**INROUTE**" menu is activated.

Selecting the input signal path

In this menu you define the signal path of the input transport streams.

Menu setting "**A+ASI = 1 B+ASI = 2**"
(s. chap. 2.4.1.1, page 6).

Menu setting "**A+B+ASI = 1 ASI = 2**"
(s. chap. 2.4.1.2, page 6).



- Use the **+**/**-** buttons to select the signal path wished.

- Press the **MODE** button.
  —> The "Selecting the output signal path" – "**OUTROUTE**" menu is activated.

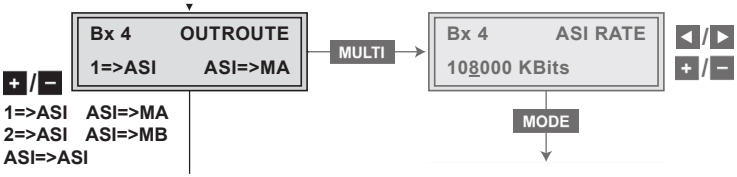
Selecting the output signal path

In this menu you define the signal path of the output transport streams.

Menu setting "**ASI => ASI**"
(s. chap. 2.4.2.1, page 7).

Menu setting "**1 => ASI ASI => MA**"
(s. chap. 2.4.2.2, page 7).

Menu setting "**2 => ASI ASI => MB**"
(s. chap. 2.4.2.3, page 7).



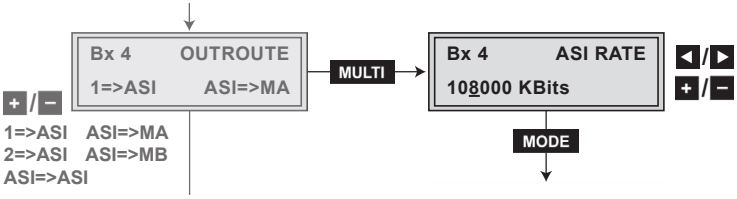
- Use the **+**/**-** buttons to select the signal path wished.

- If you do not want to do ASI settings, press the **MODE** button.
  —> The "Selecting the channel strip" – "**LINE**" menu is activated (page 24).

- Press the **MULTI** button.
  —> The "Setting the ASI transfer rate" – "**ASI RATE**" menu is activated.

Setting the ASI transfer rate

In this menu you set the transfer rate for the ASI component connected.
For this setting please take the required information from the documentation (technical data) of the ASI component to be connected.

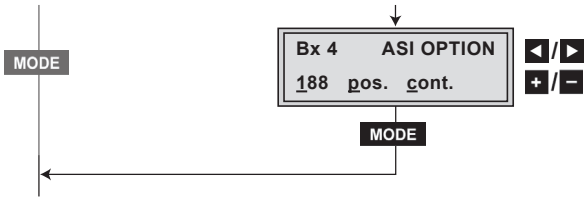


- Use the ◄/► buttons to place the cursor under the digits to be set for the transfer rate then use the +/- buttons to set the transfer rate wished.

- Press the **MODE** button.
  —> The "Setting the ASI options" – "**ASI OPTION**" menu is activated.

Setting the ASI options

In this menu you define the size of the data packets, their polarity and the type of transmission.
For this setting please take the required information from the documentation (technical data) of the ASI component to be connected.



- Press the **+**/**-** buttons to set the size of the data packets ("**188"** or "**204**" bits).

- If the polarity of the data to be transmitted has to be changed, press the **◄**/**►** buttons to place the cursor under "**pos.**" (positive – standard) and using the **+**/**-** buttons set to "**neg.**" (negative).

- To change the type of transmission press the **◄**/**►** buttons to position the cursor under "**cont.**" (continuous – standard) and using the **+**/**-** set to "**burst**".

  —> Setting "**cont.**"
  The data packets of the user data are collected to a great data packet in the transport stream.
  —> Seting "**burst**"
  The data packets of the user data are spaced out evenly in the transport stream.

- Press the **MODE** button.
  —> The "Selecting the channel strip" – "**LINE**" menu is activated.

Selecting the channel strip

- By pressing ◄ select channel strip "**A**" ("**Line A**") or select channel strip "**B**" ("**Line B**") by pressing the ► button.

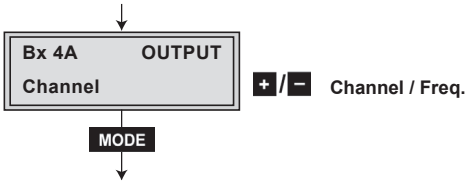
- Press the **MODE** button.
  —> The "Selecting channel / frequency setting" – "**OUTPUT**" menu is activated.

Selecting channel / frequency setting

In this menu, you can select the channel or frequency setting for the adjustment of the HF output. The channel setting covers the range of channels S21 … C69, the frequency setting covers the range from 42.0 MHz to 860.0 MHz.

The QAM signal is normally transmitted with a bandwidth of 8 MHz. This means that you can only use the channel centre frequency of the existing channel grid in the range of channels S21 … C69 (frequency grid 8 MHz). The CCIR channel grid is 7 MHz in the range of the lower frequency bands (channels C2 … S20). Therefore the frequency setting is used here. If one uses the existing channel grid of 7 MHz in these channel ranges, this will result in interference (overlapping) with the 8 MHz QAM signal packages, thus causing transmission problems.

For programming in these channel ranges and in the frequency ranges below them, we recommend starting with channel S21 / 306 MHz going back in steps of 8 MHz (s. frequency table on page 47), or reducing the bandwidth of the QAM output signal by removing stations.

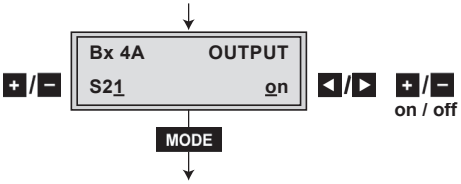


- Use **+**/**-** to select channel setting "**Channel**" or frequency setting "**Freq.**".

- Press the **MODE** button.
  —> The "Setting the output channel" or "Setting the output frequency" – "**OUTPUT**" menu is activated.

Setting the output channel

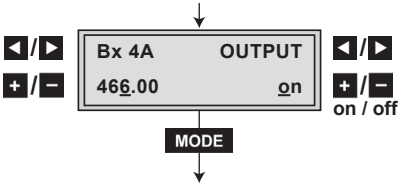
In this menu you set the output channel of the channel strip. Additionally the modulator of the channel strip can be switched off or on (page 26).



- Use the **+**/**-** buttons to set the output channel.

Setting the output frequency

In this menu you set the output frequency of the channel strip (42.0 … 860.0 MHz).
Additionally the modulator of the channel strip can be switched off or on (page 26).



- Use the **◀**/**▶** buttons to place the cursor under the digit

to be set for the frequency display then use + / - to set the output frequency wished.

Switching the modulator off or on

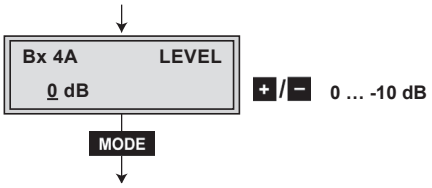
- To switch off the modulator place the cursor under "**on**" using the ▶ button and switch "**off**" the modulator of the channel strip using the + / - buttons.
  —> The switched off modulator is indicated by " - - - " in the display.
  —> The status LED is switched off (s. also page 15).

- If the modulator is switched "**off**" use the + / - to switch it "**on**".

- Press the **MODE** button.
  —> The "Adjusting the output levels of the channel strips" – "**LEVEL**" menu is activated.

Adjusting the output levels of the channel strips

This menu item is used to set the output levels of the modulators **of the channel strips "A" and "B" to the same value**.



- Measure and note down the output level of the channel strip. To adjust the output level to the output levels of the other cassettes please pay attention to chapter 7 "Final procedures".
- By repeatedly pressing the **AUDIO** button scroll back to the "Selecting the channel strip" menu.
  - Select the other channel strip (page 24) and set the following menu items:
  - "Selecting channel / frequency setting", page 24
  - "Setting the output channel" or "Setting the output frequency", page 25

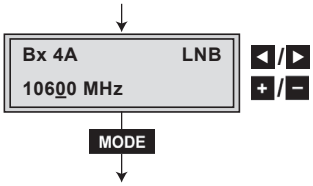
- Switch on the modulator if necessary, page 26
- Measure and note down the output level.

- Activate the "**LEVEL**" menu of the channel strip with the higher output level.
- By pressing **+**/**-** adjust the higher output level of one channel strip to the lower output level of the other channel strip incrementally from "**0**" to "**–10 dB**".

- Press the **MODE** button.
  —> The "Setting the LNB oscillator frequency" – "**LNB**" menu is activated.

Setting the LNB oscillator frequency

Set the oscillator frequency of the LNB used in this menu.

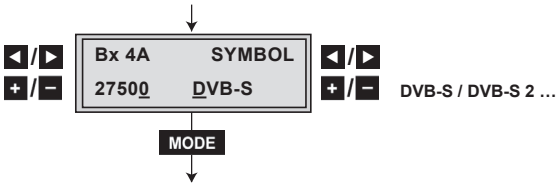


- Use ◄/► to place the cursor under the digit to be set for the frequency display.
- Press **+**/**-** to enter the oscillator frequency of the LNB used.

- Press the **MODE** button.
  —> The "Setting the input symbol rate" – "**SYMBOL**" menu is activated.

Setting the input symbol rate

The symbol rates of the satellite transponders can be found in the current channel table of the satellite operator, in various satellite magazines and in the Internet.



- Use ◄/► to position the cursor under the digit to be set for the symbol rate displayed.
- Press +/- to enter the values of the symbol rate.

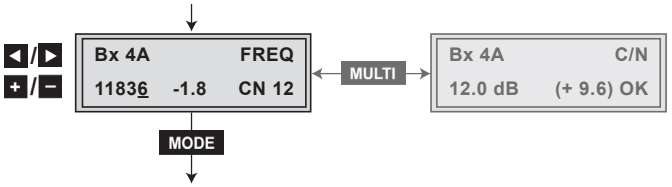
Setting the DVB mode

The cassette recognizes the transmitted DVB mode and switches over between the normal QPSK mode (DVB-S) and the DVB-S2 mode. Receiving stations with DVB-S2 mode, we suggest to preset the DVB mode to shorten the time for searching stations.

- Use the ► button to place the cursor under "**DVB-S**" and set the required DVB-S2-mode with the buttons +/- .
- Press the **MODE** button.
  —> The "Setting the input frequency" – "**FREQ**" menu is activated.

Setting the input frequency

If three dots " **...** " appear in the second line of the display, the cassette is in the "**station search**" mode. Please wait until the process has finished.
Once the HF receiver has synchronised to the input signal, any offset to the target frequency is displayed in MHz, e.g. "**– 1.8**".
If a question mark "**?**" appears in the second line of the display, there is no input signal present. Check the configuration of the antenna system and head-end station as well as the preceding settings of the cassette.

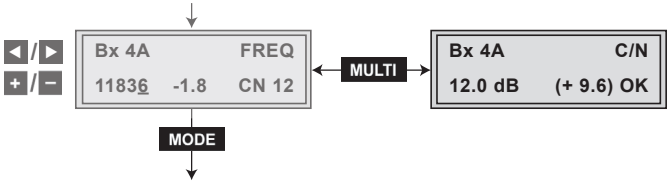


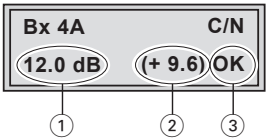
- Use ◀/▶ to position the cursor under the digit to be set of the frequency displayed.
- Press + / - to set the input frequency.
- Set the frequency offset shown in the display (e.g. "**– 1.8**") to less than 1 MHz by varying the input frequency using the + / - buttons.

- Press the **MULTI** button.
  —> The "Testing the signal to noise ratio" – "**C/N**" menu is activated.

Testing the signal to noise ratio

In this menu you can estimate the quality of the input signal.





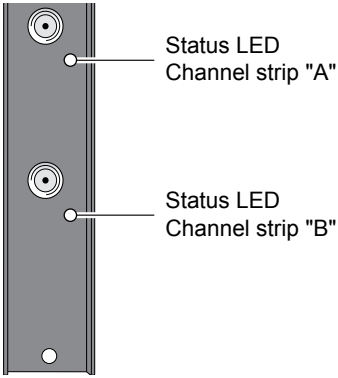
① Current signal to noise ratio

② This value shows the difference between the quality of the input signal and the threshold of the tuner at this type of modulation.
At a value lower than "**5**" picture dropouts can occur.

③ If "**OK**" is shown, the signal to noise ratio is ok.
If a value < 5 is shown under ② the display changes

from "**OK**" to "**??**". In this case test the input signal.

—> In addition to the indicator in the display, there is also a status LED which indicates the quality of the received transport stream:



LED indicator	Indication
Green	Signal quality is good
Yellow	Signal quality is poor
Red	No signal
Off	The channel strip (modulator) is switched off

• Press the **MULTI** button to return to the main menu.

If the input signal path "**A+B+ASI=1 ASI=2**" is selected the station filter of channel strip "**B**" is used in the channel strip "**A**". Therefore perform the settings for channel strip "**B**" according to the pages 27 / 28, before activating the "Setting the station filter" – "**PROGRAM**" menu.

If the input signal path "**A+ASI=1 B+ASI=2**" is selected the channel strips can be programmed one after the other.

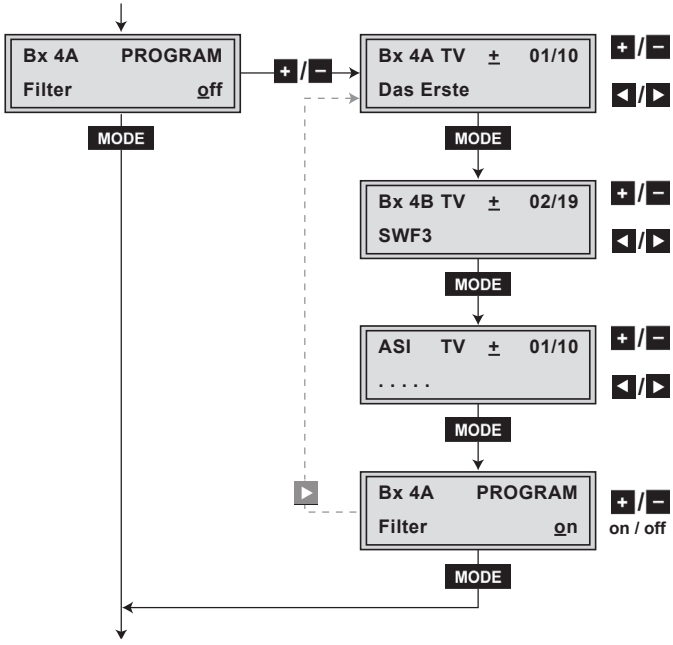
• Press the **MODE** button.
—> The "Setting the station filter" – "**PROGRAM**" menu is activated.

Setting the station filter

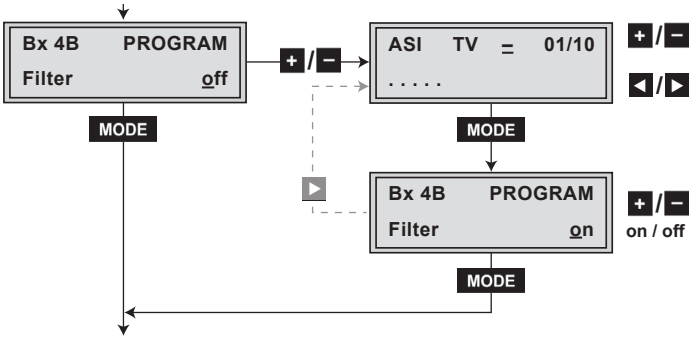
The default setting for the station filter is "**off**". In this menu you define the stations received to be transmitted. If stations are activated the output symbol rate increases.
If the station filter is switched off (factory default) all stations of the transport stream passes the station filter. As soon as the station filter is activated all stations are inactive and can be added to the transport stream selectively.

The figure of the menu below is dependent on the setting of the "Selecting the input signal path" menu (page 21).
The menu shows the setting "**A+B+ASI = 1 ASI = 2**".
With this setting the transport stream of channel strip "**B**" is routed to the transport stream of channel strip "**A**" and therefore cannot be set in channel strip "**B**". Programming channel strip "**B**" the transport stream coming from the ASI input can be processed only.

Menu setting "**A+B+ASI = 1 ASI = 2**".
Channel strip "**A**"



—> "Setting the station filter" menu of channel strip "**B**"



- Press the **+**/**-** button.
  —> All stations from the channel strip will be read, and then displayed with name and station type.
  —> If no station is found, the following error message will appear in the display: "**FILTER no Service**".
  In this case, check the configuration of the antenna system and head-end station, as well as the previously adjusted settings for the cassette and the components connected to the ASI input.
  —> The display shows e.g.: **Bx 4A TV + 01/10**
  Das Erste

Meaning of the indicators in the example:

"**Bx 4A**"	–	Slot 4, channel strip "**A**"
"**TV**"	–	TV channel type
" **+** "	–	The currently selected station is switched on.
"**01/10**"	–	The 1st of 10 stations is being displayed.
"**Das Erste**"	–	Station name

Further possible terms displayed:

"**RA**"	Radio channel type For radio stations, the background of the screen of the connected TV or test receiver is darkened.
" **–** "	The currently selected station is switched off.

" * " The star means that the TV or radio station selected is encoded. To enable the stations, the CA module and the appropriate smart card of the station provider are required.

—> If a service number (e.g. "**131**") appears instead of "**TV**" or "**RA**", this indicates that an unnamed station or an undefined data stream is being received.

- Use the ◄/► buttons to call up the stations in sequential order, then use + / - to activate (indicated by " + ") or to remove them (" – ").
  Factory default: All stations are deactivated.

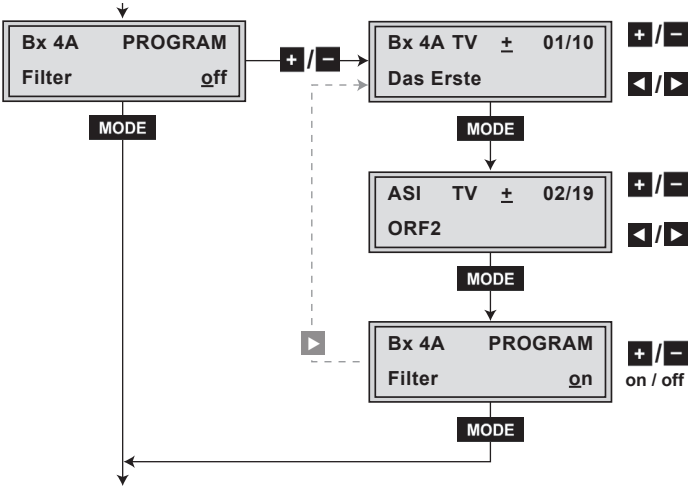
- Press the MODE button.
- Set the station filters of channel strip "**B**" and "**ASI**" in the same way as channel strip "**A**".
- To save changes and to activate the station filter press the MODE button.

—> The filter is activated.
The display shows "**PROGRAM Filter on**".
—> If stations are activated the corresponding PIDs (audio, video, text) are inserted into the data stream and the PAT and SDT tables are updated.

Test the status of the individual stations:
If the filter is switched on, press the ► button. In this mode you can test the settings of the station filters again or change them if necessary.

- In the "**PROGRAM Filter on**" menu the station filters switched on can be switched "**off**" using the buttons + / - if necessary.

Menu setting "A+ASI = 1 B+ASI = 2".
Channel strip "**A**"

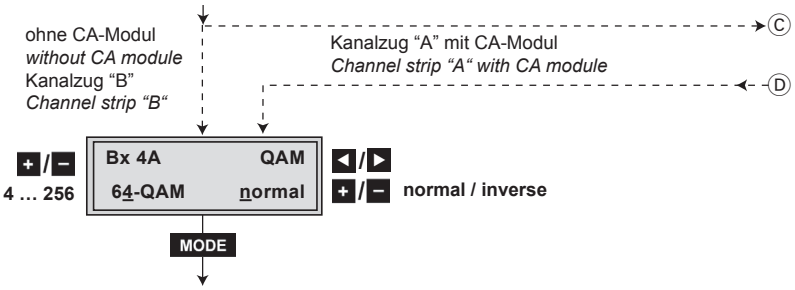


- Set the channel strip "**A**" or "**B**".
  —> The setting of the channel strips "**A**" and "**B**" is identical and follows the description above.

- Press the **MODE** button.
  —> The "Setting the QAM modulation" – "**QAM**" menu is activated when the channel strips "**A**" without a CA module installed and "**B**" are programmed.
  —> Programming the channel strip "**A**" with a CA module installed the settings for the CA module are activated (s. page 41).

Setting the QAM modulation

In this menu, you can set the QAM modulation and invert the user signal.



- Use **+**/**-** to set the QAM modulation ("**4**" … "**256**").
  —> For higher QAM modulation, the output symbol rate is lowered. An output QAM modulation of > 64 QAM places a large burden on the cable network. Due to noise, delay and frequency response problems, reception of the converted output signal can be affected.

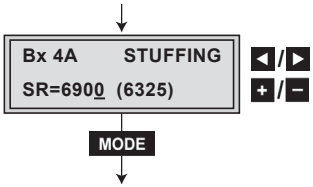
Inverting the user signal

For exceptional cases and "older" digital cable receivers, the spectral position of the user signal can be inverted.

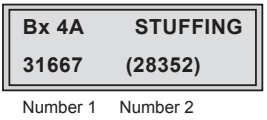
- Use **◀**/**▶** to place the cursor under "**normal**".
- Use **+**/**-** to set the spectral position to "**inverse**".

- Press the **MODE** button.
  —> The "Setting stuffing" – "**STUFFING**" menu is activated.

Setting stuffing



SR=6900 (= "Number 1"): Active output symbol rate



(**6325**) (= "Number 2"):

The current measured output symbol rate.

If the station filter is activated, this value is lower than the value of the "Number 1". The value fluctuates, since the data rates of individual stations are dynamically modified by the broadcasters.

—> "Number 2" is not displayed in the channel strips "**A**" or "**B**" at the settings "**OUTROUTE 1=>ASI ASI=>MA**" or "**2=>ASI ASI=>MB**", for the symbol rate of the ASI input signal cannot be measured. The ASI input signal therefore must be built in such a way so that the output symbol rate ("Number 1") is not exceeded.

The symbol rates of the transport streams built by the cassette can be measured at the setting "**OUTROUTE ASI=>ASI**" and be displayed in the respective channel strip.

- Use the ◄/► buttons to place the cursor under the number to be changed ("Number 1") and set the symbol rate with the buttons +/- .

The value set corresponds to the new output symbol rate.

Increasing the value of "Number 1".

—> The "Number 1" can be increased to any value up to 7500.

Reducing the value of "Number 1".

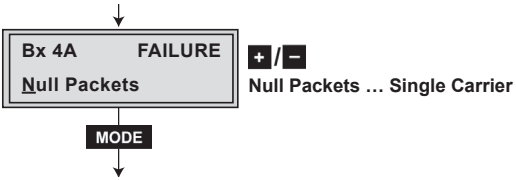
—> With the station filter switched "**on**", the "Number 1" can be decreased. To do this, observe the "Number 2" for approx. 30 seconds and note the highest value. Add roughly 10 % to this value. Do not decrease the "Number 1" lower than the value of "Number 2".
Is the "Number 1" lower than "Number 2" question marks "**??**" appear in the display.

Bx 4A	STUFFING
31667	(36906) ??

- Press the **MODE** button.
  —> The "Setting a substitute signal in the case of an incorrect input signal" – "**FAILURE**" menu is activated.

Setting a substitute signal in the case of an incorrect input signal

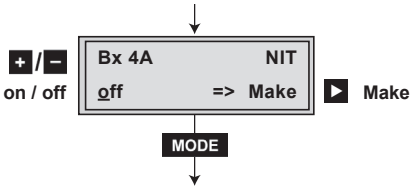
You use this menu to set whether a QAM signal filled with "**Null Packets**", a QAM signal filled with null packets and self-made tables "**Tables**" or a "**Single Carrier**" signal should be provided as an output signal whenever an incorrect input signal occurs. Self-made tables are transmitted furthermore.



- Use the **+**/**-** buttons to set the output signal required.

- Press the **MODE** button.
  —> The "Network Information Table" – "**NIT**" menu is activated.

Network Information Table (NIT)



- To switch NIT on/off ("**on**"/"**off**") press the **+**/**-** buttons.

- Press the ▶ button to activate NIT "**Make**".
  All active …-QAM cassettes must be set and ready for reception.

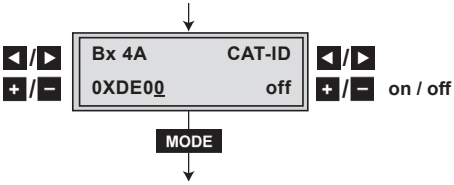
  —> The NIT of all …-QAM cassettes are switched on.
  —> The cassette fetches all the information (output frequencies, output symbol rates, etc.) it needs from all the …-QAM cassettes in order to generate the cable NIT. This process may take a few seconds.
  Then the NIT is generated, added and sent to all …-QAM cassettes. The other …-QAM cassettes also add this new cable NIT. The status of all …-QAM cassettes in the NIT menu changes to "**on**".
  The display shows: "**read … / copy …**".

- To switch off the new NIT ("**off**") press the **-** button.
  The cable NITs of the other …-QAM cassettes will stay switched on. When the cable NIT of the cassette is switched on again ("**on**") by pressing the **-** button, the previously generated NIT is added again. If you have changed parameters in the meantime, you must first select "**Make**" to generate a new, up-to-date NIT.

- Press the **MODE** button.
  —> The "Network/operator identification" – "**CAT-ID**" menu is activated.

Network/operator identification

In this menu, you can change the network/operator identification (CAT-ID – **C**onditional **A**ccess **T**able - **Id**entification), for example of the visAvision transponder (Eutelsat 8° West).



CAT is not to be changed.

- Press the **MODE** button.
  —> The "Deleting a PID" – "**DROP**" menu is activated (page 40).

CAT is to be changed.

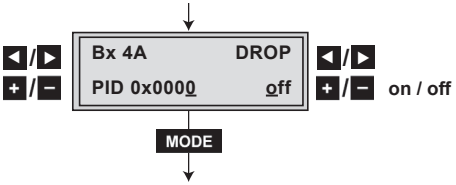
The network operator e.g. requires that you set the operator ID of the visAvision transponder to "2".

- Use the **◀/▶** buttons to position the cursor under the digit to be set.
- Use **+/-** to change the operator ID from "**0xDE00**" to "**0xDE02**".
- Use the **▶** button to position the cursor under "**off**," then use **+/-** to activate the new CAT "**on**".
  —> The menu display switches to "**modified**".
  —> If you try to change the network/operator identification (operator ID) of a transponder which cannot be modified, "**not modified**" appears in the display.

- Press the **MODE** button.
  —> The "Deleting a PID" – "**DROP**" menu is activated.

Deleting a PID

In this menu a PID of the transport stream can be deleted.

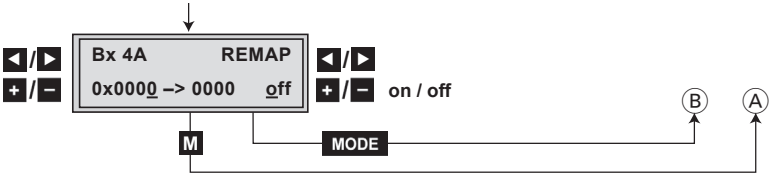


- Use the ◄/► buttons to place the cursor under the respective digit of the hexadecimal number of the PID to be deleted ("**0x0000**") and set the hexadecimal number using +/-.
- Use ► to set the cursor to "**off**" and switch to "**on**" (delete) using the +/- buttons.

- Press the **MODE** button.
  —> The "Renaming a PID" – "**REMAP**" menu is activated.

Renaming a PID

In this menu you can allocate a new address to a PID retaining the complete data content.



- Use the ◄/► buttons to place the cursor under the respective digit of the hexadecimal number of the PID to be changed ("**0x0000**") and set the hexadecimal number using +/-.
- Use the ◄/► buttons to place the cursor under the respective digit of the hexadecimal number of the new PID ("**–> 0000**").
- Set the hexadecimal number using +/-.
- Use ► to set the cursor to "**off**" and switch to "**on**" (rename) using the +/- buttons.

Saving settings

- Press the **M** button.
  —> Back to "Selecting the cassette" Ⓐ (page 20).
  —> The settings are saved.
  —> If functions of the TPS module are activated, their status is shown in the second line of the display:
  "**M**" – Station filter is switched on.
  "**N**" – NIT is activated.
  "**C**" – Network/operator identification CAT is activated.

  —> By pressing the **MODE** button, you will be returned to the menu item "Selecting the channel strip" via Ⓑ **without** saving the programmed data (page 24).
  —> If necessary set channel strip "**B**".

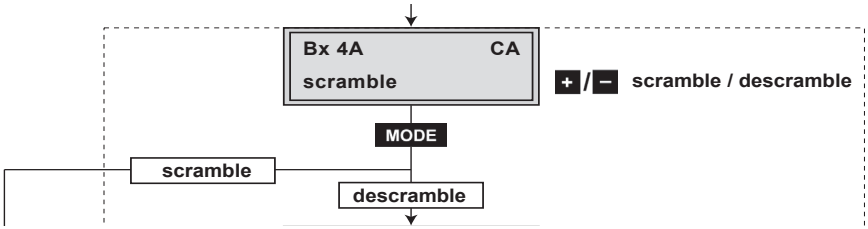
5.4.1 Operation with a CA module

In order for this function of the CA module to be possible, stations capable of being encoded (only PHDQ 1001) or decoded by the CA module you are using and your smart card must be selected in the "Setting the station filter" – "**PROGRAM**" menu (page 31).
Short-term picture loss may occur when switching between coded and uncoded broadcasts within one service (e.g. coded stations and uncoded regional broadcasters).

- Press the **MODE** button.
  Cassette PHDQ 1001:
  —> The "Setting the encoding" – "**CA**" menu is activated.
  Cassette PHDQ 1000 ASI LAN:
  —> The "Setting the PID monitoring" – "**CA**" menu is activated (page 42).

Setting the encoding (only PHDQ 1001)

With cassette PHDQ 1001 it is possible to encode uncoded channels. You can set whether you want to decode encoded channels ("descramble"), or to encode uncoded channels ("scramble").

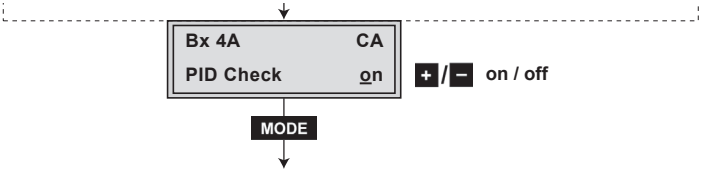


- Use the **+** / **-** buttons to set encoding "**scramble**" or decoding "**descramble**".

- Press the **MODE** button.
  In case of setting "**scramble**":
  —> The "Setting the QAM modulation" – "**QAM**" menu is activated (page 35).
  In case of setting "**descramble**":
  —> The "Setting the PID monitoring" – "**CA**" menu is activated.

Setting the PID monitoring

The factory default of the PID monitoring is switched on.
If particular PIDs are not decrypted the CI module is reset. If dropouts occur during the decoding of several stations the PID monitoring can be switched off.

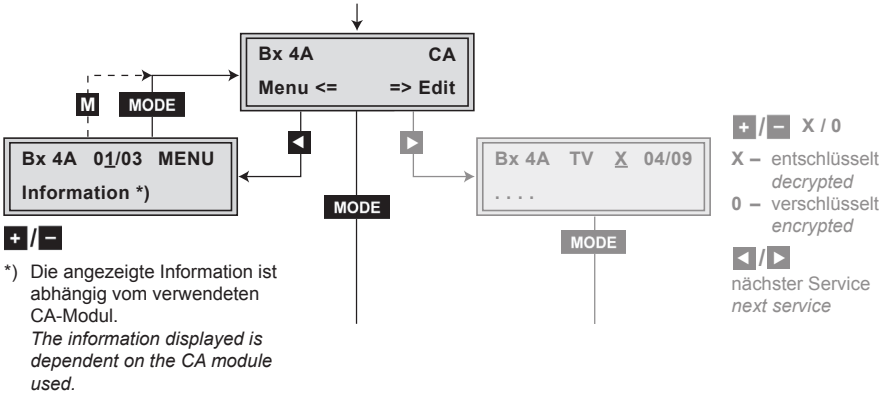


- Use the **+** / **-** buttons to switch "**off**" or "**on**". the PID monitoring.

- Press the **MODE** button.
  —> The "Configuring the CA module" – "**CA**" menu is activated.

Configuring the CA module

The menu varies according to which CA module you are using. For this reason, please refer to the operating manual of your particular CA module. The relevant information is shown in the display of the head-end station. This may appear as a fixed display or as scrolling text according to display capabilities.



*) Die angezeigte Information ist abhängig vom verwendeten CA-Modul.
The information displayed is dependent on the CA module used.

—> By pressing the **MODE** button you can skip the "Configuring the CA module" – "**CA**" menu and activate the "Setting the QAM modulation" – "**QAM**" menu (page 35).

- Press the ◄ button to activate the menu of the CA module.
  —> The display shows e.g.: **Bx 4A 01/03 MENU Information**

Meaning of the indicators:

"**Bx 4A**"	–	Slot 4, channel strip "**A**"
"**01/03**"	–	The first of three menu items is activated.
"**MENU**"	–	The menu of the CA module is activated.

For the explanation of further details please use the operating instructions of the CA module used.

- Use the **+**/**-** buttons to activate the menu desired.
- Press the ► button to activate the menu.
- Use the **+**/**-** buttons to select the function desired.

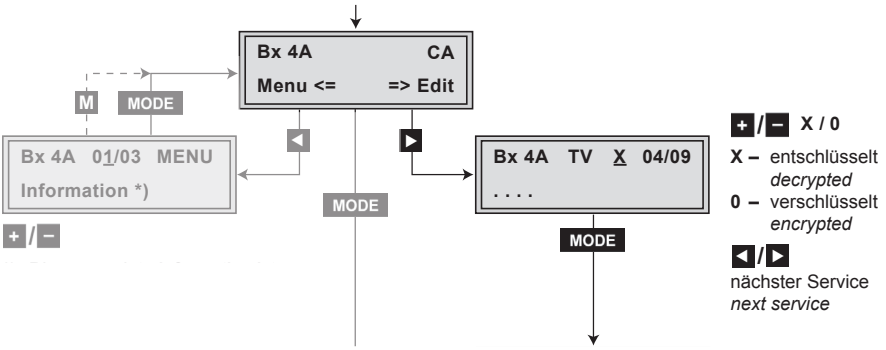
- To set the CA module use the ◄/► and +/- buttons.
- All settings are saved by pressing the M button.
  —> You will be returned to the "Configuring the CA module" – "**CA**" menu item.
  —> By pressing the MODE button you can cancel the settings in the menu of the CA module and are returned to the "Configuring the CA module" – "**CA**" menu.

- Press the ► button.
  —> The "Setting the station filter" – "**Edit**" menu is activated.

Setting the station filter

In this menu you select the stations wished from the encoded data stream, which are to be decoded.

—> The display shows e.g.: **Bx 4A TV X 04/09**
. . . .



Meaning of the indicators in the example:

"**Bx 4A**"	–	Slot 4, channel strip "**A**"
"**TV**"	–	TV channel type
"**X**"	–	The currently selected station is decrypted.
"**04/09**"	–	The 4th of 9 stations read is being displayed.
"**. . . .**"	–	Station name

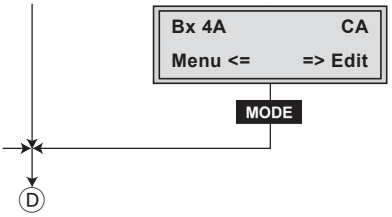
Further possible terms displayed:

"**RA**" – Radio channel type

"**0**" – The currently selected station is encrypted.

- Use the ◄/► buttons to call up the stations in sequential order which are to be decoded, then use +/- to decrypt ("**X**") or not to decrypt them ("**0**").

- Save changes and activate the station filter:
  Press the **MODE** button.
  —> The filter is activated. The display shows the "Configuring the CA module" – "**CA**" menu.



- Press the **MODE** button.
  —> The "Setting the QAM modulation" – "**QAM**" menu is activated (page 35).

6 Final procedures

After installing the head-end station, upgrading accessories or installing cassettes it is necessary to tighten all cable connections, cable terminals and cover screws in order to maintain compliance with current EMC regulations securely.

- Securely tighten the cable connections using an appropriate open-ended spanner.
- Measure the output levels of the other cassettes and tune them to a uniform output level using the appropriate level controls or software dependent on the head-end station used. Please regard the assembly instructions of the respective head-end station.
- Mount the front cover (s. assembly instructions of the head-end station).

7 Channel and frequency tables

Advice for a frequency grid (8 MHz) in the Band I/III

Frequenzraster Frequency grid [MHz]	Frequenzraster Frequency grid [MHz]	Frequenzraster Frequency grid [MHz]	Frequenzraster Frequency grid [MHz]	Frequenzraster Frequency grid [MHz]	Frequenzraster Frequency grid [MHz]
42.00	82.00	146.00	186.00	226.00	266.00
50.00	114.00	154.00	194.00	234.00	274.00
58.00	122.00	162.00	202.00	242.00	282.00
66.00	130.00	170.00	210.00	250.00	290.00
74.00	138.00	178.00	218.00	258.00	298.00

CCIR – Hyperband (Frequency grid 8 MHz)

Kanal Channel	Kanalmittenfrequenz Channel centre frequency [MHz]	Kanal Channel	Kanalmittenfrequenz Channel centre frequency [MHz]	Kanal Channel	Kanalmittenfrequenz Channel centre frequency [MHz]	Kanal Channel	Kanalmittenfrequenz Channel centre frequency [MHz]	Kanal Channel	Kanalmittenfrequenz Channel centre frequency [MHz]
S 21	306.00	S 26	346.00	S 30	378.00	S 34	410.00	S 38	442.00
S 22	314.00	S 27	354.00	S 31	386.00	S 35	418.00	S 39	450.00
S 23	322.00	S 28	362.00	S 32	394.00	S 36	426.00	S 40	458.00
S 24	330.00	S 29	370.00	S 33	402.00	S 37	434.00	S 41	466.00
S 25	338.00								

CCIR – Band IV/V (Frequency grid 8 MHz)

C 21	474.00	C 31	554.00	C 41	634.00	C 51	714.00	C 61	794.00
C 22	482.00	C 32	562.00	C 42	642.00	C 52	722.00	C 62	802.00
C 23	490.00	C 33	570.00	C 43	650.00	C 53	730.00	C 63	810.00
C 24	498.00	C 34	578.00	C 44	658.00	C 54	738.00	C 64	818.00
C 25	506.00	C 35	586.00	C 45	666.00	C 55	746.00	C 65	826.00
C 26	514.00	C 36	594.00	C 46	674.00	C 56	754.00	C 66	834.00
C 27	522.00	C 37	602.00	C 47	682.00	C 57	762.00	C 67	842.00
C 28	530.00	C 38	610.00	C 48	690.00	C 58	770.00	C 68	850.00
C 29	538.00	C 39	618.00	C 49	698.00	C 59	778.00	C 69	858.00
C 30	546.00	C 40	626.00	C 50	706.00	C 60	786.00		

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